Mounting and operating instructions

RTWU 301 UN Room Temperature Controller

459238.66.54   12/06/F

Room temperature controller with week cycle clock, floor temperature thermostat and floor temperature sensor integrated in a flush mounted switch installation frame.

IMPORTANT! This device complies with the following standards: EN 60730-1, EN 50082-1 and EN 61000 and may, in compliance with the pertinent VDE safety regulations (German regulations for electrics) and the rules and prescriptions established by the local power supply companies currently operative and in force, be installed by an expert electrician only.

1. Application

The specially has been specially devised for use within the limits of technological building applications. It suits especially for the control of temperatures produced by floor heating- and floor temperature equalization systems and is mounted in an UP box.
It can either be mounted as an independent device or be mounted flush using DIN 49075 compliant intermediate frames which allow adaptation **to almost all currently available flush switch installation frames.**

2. Functioning

Based on the data sensed by an integrated sensor, the controller measures the existing room temperature. As long as the maximum admissible floor temperature is not transcended, the heating contact is, upon the lower deviation of the room temperature set value, closed. The signal ⚡ indicates that the heating phase is active. The operation of the digital week cycle clock is based on three different programs that enable to change over from comfort temperature to temperature decrease mode. The controller is delivered preset to „normal" day sequences, see section 20, "Factory settings".

All settings are stored permanently. Actuating the reset key enables to reset to the factory settings.
Actuating the touch key [M] enables to select the following operating modes:

❄ Frost   antifreezing mode active, approx. 7°C
☾ Night   temperature decrease mode (permanent)
☀ Day   comfort temperature mode (permanent)
🕓 Clock   clock-controlled change-over between comfort and temperature decrease mode

In adjusting mode (see section 19), the individual functions can be adapted as follows:

J1 Indication: <u>set value / clock time</u> alternately, set value, clock time (factory setting)
J2 Max. set temperature . . . . 6 ... 30° C   (factory setting = 30°C)
J3 Max. set temperature . . . . 5 ... 29° C   (factory setting = 5°C)
J4 Temperature correction . . . . − 9 ... +8 K   (factory setting = 0 K)
J5 Max. floor temperature . . . . 20 ... 60°C   (factory setting = 50°C)
J6 Load current correction . . . . 1 ... 10 A   (factory setting = 6 A)
J7 Self-learning function . . . . 0/1 (factory setting = 1 = activated)

3. Technical data

Operating voltage: . . . . 230 V / 50 Hz
Range of control: . . . . 5 ... 30° C
Display range: . . . . 0 ... 40° C
Temperature setting: . . . . in 0.5 K steps
Sensor tolerance: . . . . ± 0.5 K
Switching difference: . . . . approx. 1 K
Power consumption: . . . . approx. 1.5 VA
Temperature decrease: . . . . adjustable (factory setting: 4 K)
Heating contact: . . . . make contact, max. 230 V, 10 (2) A
Internal sensor: . . . . NTC, 47 K
External sensor: . . . . NTC, 2 K

Indications: . . . . LCD display
Electrical connections: . . . . screw terminals (1.5 ... 2.5 mm²)
Degree of protection: . . . . IP 30
Protection class after
corresponding installation: II
Mounting: . . . . in ⌀ 55 UP box
Ambient temperature: . . . . 0 ... 30° C
Storage temperature: . . . . −20 ... +70°C
Radio interference suppression: . . . acc. to EN 50081-1, EN 50082-1
Power reserve: . . . . 4 days (after 1 service hour)
Adjusting options: . . . . see section 2, adjusting mode
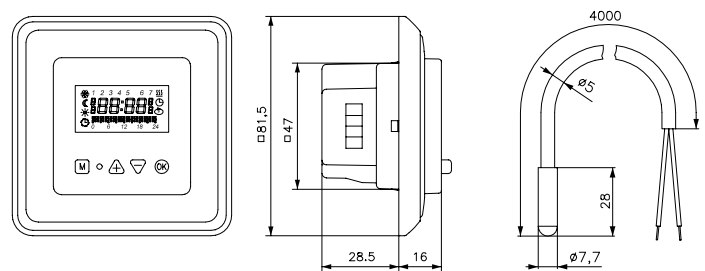
4. Scope of delivery

The controller is delivered complete with switch frame cover.

5. Opening of the controller housing

Caution: To remove the housing cover (1) by pulling it off, make sure to hold <u>the switch frame</u> (3) at both sides, top and bottom!
Use a screw driver to remove the housing frame. Put it underneath the <u>switch frame</u> and lever the housing off.
Note: the housing cover is locked into place and has no screws!!!
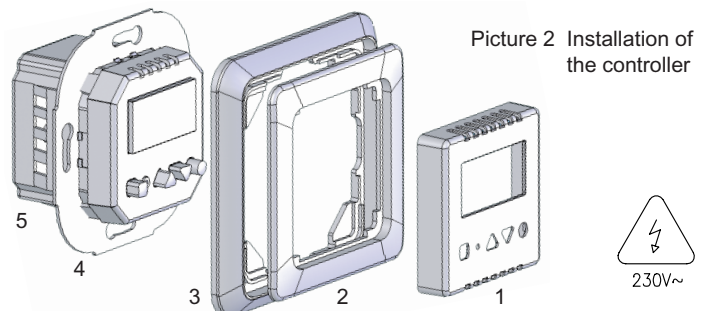– Remove both the intermediate frame (2) and the switch frame (3)

Picture 1 Dimensional drawing

6. Installation of the controller

Caution: Prior to installing the device, always make sure to cut the mains voltage off at all poles!
– Electrical connection according to connection scheme 3 with screw terminals (isolation to be stripped over a distance of 6 to 8 mm).
– Solid conductor, diameter load dependent (1.5 ... 2.5 mm²)
– Without protective conductor connection
– Install the controller (5) in UP box by fixing the support collar (4) **on the wall surface** using screws

Picture 2 Installation of the controller

7. Installation of the control sensor

– Installation in a protecting sleeve within the floor pavement between the heating loops without touching them.
– Sensor line encased in a protective tube. Parallel laying with power supply lines is inadmissible.
– Extension possible up to 50 m with 0.5 mm² wire (flexible wires with wire-end sleeves)
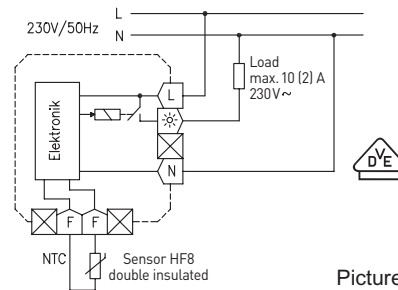
Beware: Mains voltage can be present at the sensor in the event the sensor is improperly connected or if a failure occurs! The sensor used with the device is an EN 60730-2-1 compliant double-insulated type, therefore. Any extension is admissible only when applying a double insulation in compliance with EN 60730-2-1.

5 21 210 01

8. Closing of the housing of the device

– To reclose the housing, proceed in inverse order of the steps explained in above section 5.

9. Terminal designation

☼ Heating connection
L   Phase connection
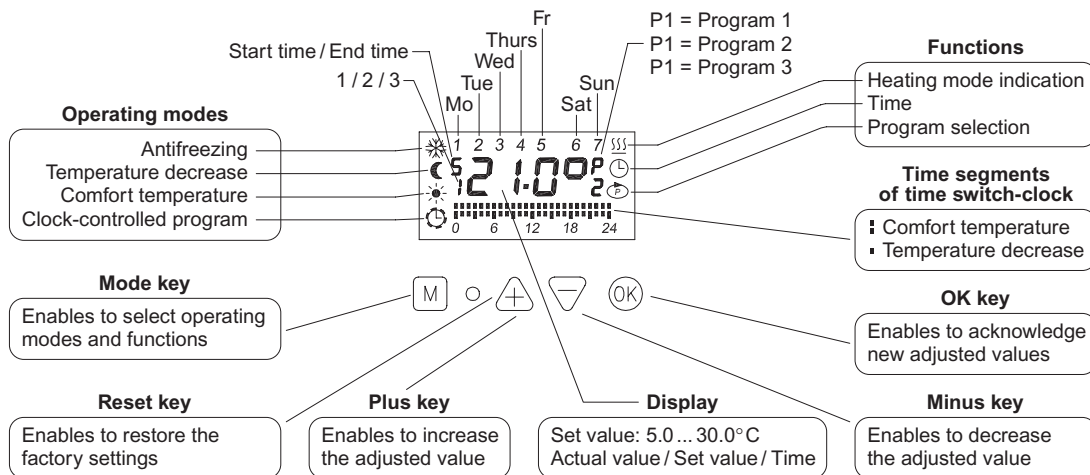N   Neutral connection
F   Sensor connection

Picture 3 Connection scheme

10. Self-learning function

Function: Autonomous adjustment of the controller to the moment at which the heating time starts running. Objective: To attain the comfort temperature at the adjusted time. In the delivered condition, the self-learning function is activated, but can also be deactivated (see section 19.7).

11. Display / symbols used

Operating modes
Antifreezing
Temperature decrease
Comfort temperature
Clock-controlled program

Start time / End time
1 / 2 / 3

P1 = Program 1
P1 = Program 2
P1 = Program 3

Functions
Heating mode indication
Time
Program selection

Time segments of time switch-clock
⁞ Comfort temperature
▪ Temperature decrease

Mode key
Enables to select operating modes and functions

OK key
Enables to acknowledge new adjusted values

Reset key
Enables to restore the factory settings

Plus key
Enables to increase the adjusted value

Display
Set value: 5.0 ... 30.0° C
Actual value / Set value / Time

Minus key
Enables to decrease the adjusted value

12. Activation

– Upon connection to the supply voltage, all symbols are displayed for 10 sec.
– The heating is active upon the lower deviation of the set value
– Actual temperature and time are displayed alternately
– After start-up, the comfort temperature operating mode is set all automatically and the controller is activated immediately
– All time segments are being displayed
– No date of the day is displayed, as time and day have not been set yet
– Correct control accuracy and actual temperature indication are attained after about 3 hrs.

13. Changing the set temperature

☞ ⊕▽ ⇨ ... 21.0° ... ☞ ⓄⓀ

– Actuating the ⊕ key increases the temperature
– Actuating the ▽ key decreases the temperature
– Acknowledge within 20 sec. using the ⓄⓀ key, if not, the previously adjusted value remains operative
– Set temperature is being displayed
– Heating active ℠ upon lower deviation of set value

14. Setting / adjusting the clock

☞ Ⓜ ⇨ 🕐 **16**:34

☞ ⊕▽ ⇨ ... **16** ... ☞ ⓄⓀ

☞ ⊕▽ ⇨ ... **34** ... ☞ ⓄⓀ

☞ ⊕▽ ⇨ 123**4**5 67 ☞ ⓄⓀ

– Press the key Ⓜ till the symbol 🕐 appears → the time is being displayed (blinks at first start-up or after power failure)
– Use the key ⊕ or ▽ to set the hours
– Acknowledge using the ⓄⓀ key → minutes start blinking
– Use the key ⊕ or the ▽ key to set the minutes
– Acknowledge using the ⓄⓀ key → the date of the day starts blinking
– Use the key ⊕ or ▽ to set the day (1 = Monday ... 7 = Sunday)
– Use the ⓄⓀ key to acknowledge
– After the first setting of the clock (at first start-up), the display changes to the operating mode „clock-controlled program" (see 14.4), if not, the display changes to comfort temperature mode (see 14.3).

15. Setting of the desired operating modes

15.1. Selection of the antifreezing mode

☞ Ⓜ ⇨ ❄

– Press the key Ⓜ till the symbol ❄ appears
Fixed set value: 7°C. All other indications, except the frost symbol, disappear after 20 sec.

15.2. Selection of the temperature decrease mode

☞ Ⓜ ⇨ ☾ 17.0°

☞ △▽ ⇨ ...17.0°... ☞ Ⓞ🅚

– Press the key Ⓜ till the symbol ☾ appears → the adjusted temperature decrease mode value is being displayed (only the bottom time segment row is visible)
– Actuate the △ key to increase the temperature → the adjusted value is being displayed
– Actuate the ▽ key to decrease the temperature set value
  (applies also to the temperature decrease function within the clock-controlled program mode)
– Acknowledge within 20 sec. using the Ⓞ🅚 key: If not, the previously adjusted value remains operative.

15.3. Selection of the comfort temperature mode

☞ Ⓜ ⇨ ☀ 21.0°

☞ △▽ ⇨ ...21.0°... ☞ Ⓞ🅚

– Press the key Ⓜ till the symbol ☀ appears → the adjusted comfort temperature mode value is being displayed (only the upper time segment row is visible)
– Actuate the △ key to increase the temperature set value → the adjusted value is being displayed
– Actuate the ▽ key to decrease the temperature set value
  (applies also to the comfort temperature function within the clock-controlled program mode)
– Acknowledge within 20 sec. using the Ⓞ🅚 key. If not, the previously adjusted value remains operative.

15.4. Selection of the clock-controlled program mode   possible only, if the clock has been set (see section 14)

☞ Ⓜ ⇨ 🕒 21.0°

☞ △▽ ⇨ ...21.0°... ☞ Ⓞ🅚

– Press the key Ⓜ till the symbol 🕒 appears → the actual set value is being displayed and the corresponding program P1, P2 or P3 allocated to the respective week-day is activated (see section 16 and 17)
– **Time controlled change-over between comfort temperature (upper time segment row) and temperature decrease mode** (bottom time segment row) in dependence on the actual week-day and the respective switching times programmed

15.5. Gerät ausschalten / wieder einschalten

Achtung! Diese Funktion setzt die Frostschutz-funktion ausser Betrieb!

– Durch 3 Sekunden langes Drücken der Taste Ⓜ in einem beliebigen Betriebszustand wird das Gerät ausgeschaltet.
– Im Display wird permanent „OFF" angezeigt
– Durch kurzes Drücken der Taste Ⓜ wird das Gerät wieder eingeschaltet und kehrt in die letzte Betriebsart vor dem Ausschalten zurück.

16. Week-day program allocation

☞ Ⓜ ⇨ ⓟ **Pr1** 1 2 3 4 5

– Press the key Ⓜ till the symbol ⓟ appears
  Program 1 including the actually allocated week-days are being displayed

<u>Please note:</u> None of the week-days can be removed from the program. To remove a day from this program, the related day has to be allocated to another program. Double programming is thus avoided.

☞ ▽ ⇨ 6...

– Actuate the key ▽ to display week-days which have not yet been allocated to this program → the number of the selected day starts blinking

☞ Ⓞ🅚 or ▽

– Use the Ⓞ🅚 key to add the thus selected week-day to this program or use the key ▽ to change over to the next, not yet assigned day

☞ △ ⇨ **Pr1...Pr2...Pr3**

– Press the key △ to proceed to the next program → the programs Pr2, Pr3, Pr1 … including the actually allocated week-days are being displayed

☞ ▽ ⇨ 6...

– Press the key ▽ to display all days not yet allocated to this program → the number of the selected day starts blinking

☞ Ⓞ🅚 or ▽

– Use the Ⓞ🅚 key to add the selected day to this program or use the key ▽ to change over to the next, not yet assigned day

– All entries have to be acknowledged using the Ⓞ🅚 key

☞ Ⓜ ⇨ ❋

– Terminate by actuating the key Ⓜ and set the desired operating mode (see section 15.)

– If no key is actuated, the controller changes automatically back to comfort temperature mode after the expiry of a 20 sec. time.

17. Changing of program switching times

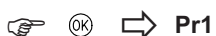Regarding the factory settings of the three existing programs, see section 20.
Program 1 → 2 heating times (2 x comfort temperature and 2 x temperature decrease)
Program 2 → 1 heating time (1 x comfort temperature and 1 x temperature decrease)
Program 3 → 3 heating times (3 x comfort temperature and 3 x temperature decrease)

☞ Ⓜ ⇨ 🕒

– Press the Ⓜ key till the symbol 🕒 appears

☞ Ⓞ🅚 ⇨ **Pr1**

– Actuate the Ⓞ🅚 key → the program allocated to the actual day is indicated

☞ △▽ ⇨ **Pr1...Pr2...Pr3**

– Actuate the key △ or ▽ to select the switching program to be changed (Pr1, Pr2 or Pr3)

☞ Ⓞ🅚 ⇨ S 1 06 : 00 P 1

– Actuate the Ⓞ🅚 key to change over to the **1st start time** (ON)
  (actuating the Ⓞ🅚 key again brings you to the next switching time)

☞ △▽ ⇨ **05 : 45...06 : 00...06 : 15**

– Actuate the key △ or ▽ to set the 1st start time (in 15 min. steps)

☞ Ⓞ🅚 ⇨ E 1 09 : 00 P 1

– Acknowledge using the Ⓞ🅚 key to change over to the 1st end time

☞ △▽ ⇨ **05 : 45...06 : 00...06 : 15**

– Actuate the key △ or ▽ to set the 1st end time (in 15 min. steps)

OK	**09 : 00**		– Press the OK key to change over to the **2ⁿᵈ start time**

☞ OK **09 : 00**
— Press the OK key to change over to the **2nd start time**

☞ ⇨ **S P / 2 1**

☞ ⊕▽ ⇨ **15:45...16:00...16:15**
— Proceed in the same manner to enter the 2nd start and end time

☞ OK ⇨ **E₂ 23:00**

☞ ⊕▽ ⇨ **22:45...23:00...23:15**
— Acknowledge the last end time using the OK key

☞ OK ⇨ **S₁ 06:00**

☞ M ⇨ 🕐
— Use the key M to finish the setting program and to return to the clock-controlled operating mode

— If no key is pressed, the controller changes automatically back to clock-controlled operating mode after the expiry of a 20 sec. time. All values not confirmed by means of the OK key are not imported then.

18. Party function (short-time change of the set temperature during clock-controlled operating program mode till to the next switching time)

— Changing of temperature during the clock-controlled operating program
(applies only up to the next switching time)

☞ M ⇨ 🕐
— Press the key M till the symbol 🕐 appears

☞ ⊕▽ ⇨ **...21.0°...** ☞ OK
— Actuating the ⊕ key increases the temperature
— Actuating the ▽ key decreases the temperature

☞ OK ⇨ 🕐
— Acknowledge using the OK key → the clock-controlled operating program is now effective with the changed temperature value till to the next switching time

19. Fine adjustment Individual setting of operating parameters – remain stored even in the event of a power failure

☞ M ⇨ ❄
— Press the key M till the symbol ❄ appears
(fine adjustment can be made in antifreezing mode only)

☞ OK + M 5 sec. ⇨ **Just** ⇨ **J₁ S**
— Actuate the key OK first and hold it depressed, then press the key M for 5 sec. till **Just** is being displayed, then let the key go

— Actuating the key M enables to quit the adjusting mode at any time. All values not confirmed by means of the OK key are not imported then.

19.1. Adjustment of the type of indication = J1

J₁ ☞ ⊕▽ ⇨ **IuU...I...U**
— Actuate the key ⊕ or ▽ to select the type of indication
IuU The actual value and the clock time are being displayed alternately for approx. 5 sec. (factory setting)
I The actual value is being displayed permanently
U The clock time is being displayed permanently

☞ OK ⇨ **J₂**
— Use the OK key to acknowledge
→ the next fine adjustment setting **J₂** is being displayed

19.2. Max. surface temperature = J2 Limitation of the adjustable max. room temperature

J₂ ☞ ⊕▽ ⇨ **6.0°...30.0°**
— Actuate the key ⊕ or ▽ to limit the max. room temperature
(difference between max. and min. surface temperature: min. 5 K, minimum value changes in the event this difference is being underrun)

☞ OK ⇨ **J₃**
— Use the OK key to acknowledge
→ the next fine adjustment setting **J₃** is being displayed
— (factory setting: 30° C)

19.3. Min. room temperature = J3 Limitation of adjustable min. room temperature

J₃ ☞ ⊕▽ ⇨ **5.0°...29.0°**
— Actuate the key ⊕ or ▽ to limit the min. room temperature
(difference between max. and min. surface temperature: min. 5 K, maximum value changes in the event this difference is being underrun)

☞ OK ⇨ **J₄**
— Use the OK key to acknowledge
→ the next fine adjustment setting **J₄** is being displayed
— (factory setting: 5° C)

19.4. Temperature adjustment = J4 Adjustment of the room temperature

An unfavourable installation place, unfavourable air circulation or a high wall / room temperature difference may cause deviations between the actual room temperature and the values actually indicated. The adjusting procedure described herafter enables to balance these deviations.

— A temperature correction should be performed only 3 hrs. after the first start-up of the device.

J₄ ☞ ⊕▽ ⇨ **–9,0...0,0...8,0**
— Actuate the key ⊕ or ▽ to select the desired correction value

☞ OK ⇨ **J₅**
— Use the OK key to acknowledge
→ the next fine adjustment setting **J₅** is being displayed
— (factory setting: 0 K)

19.5. Max. floor temperature = J5 Limitation of the max. floor temperature

J₅ ☞ ⊕▽ ⇨ **20.0°...60.0°**
— Actuate the key ⊕ or ▽ to limit the max. room temperature
— Use the OK key to acknowledge
→ the next fine adjustment setting **J₆** is being displayed

☞ OK ⇨ **J₆**
— (factory setting: 50° C)

$\frac{J}{6}$ ☞ △▽ ⇨ **1...10 AL**

– Actuate the key △ or ▽ to display the load current in [A].

☞ ⊙ ⇨ $\frac{J}{7}$

– Use the ⊙ key to acknowledge
  → the next fine adjustment setting $\frac{J}{7}$ is being displayed
– (factory setting: 6 AL)

$\frac{J}{7}$ ☞ △▽ ⇨ **0/1**

– Actuate the key △ or ▽ key to activate (= 1) or deactivate (= 0) the self-learning function.

☞ ⊙ ⇨ $\frac{J}{1}$

– Use the ⊙ key to acknowledge;
  → the first fine adjustment setting $\frac{J}{1}$ is being displayed.
– (factory setting = 1)

☞ Ⓜ ⇨ ❄

– Actuate the key Ⓜ once shortly to terminate the fine adjustment mode and to return to the antifreezing program (see section 17.1.).

20. Reset function / factory settings Restoration of the factory settings – individual settings will get lost

– the adjusted settings remain stored

↘○

– use an edgeless non-conducting object to press the sunk key shortly

Antifreezing temperature: . . . . 7° C
Comfort temperature: . . . . 21° C
Decrease temperature: . . . . 17° C

Clock-controlled program 1:   2 heating times (comfort temperature times): . . . . Assignments: Monday till Friday 1, 2, 3, 4, 5

  1. start time $\binom{S}{1}$ 06.00 →   1. end time $\binom{E}{1}$ 09.00

  2. start time $\binom{S}{1}$ 16.00 →   2. end time $\binom{E}{1}$ 23.00

Clock-controlled program 2:   1 heating time (comfort temperature time): . . . . Assignments: Saturday, Sunday 6, 7

  1. start time $\binom{S}{1}$ 07.00 →   1. end time $\binom{S}{1}$ 23.00

Clock-controlled program 3:   3 heating times (comfort temperature times): . . . . Assignments: None

  1. start time $\binom{S}{1}$ 06.00 →   1. end time $\binom{S}{1}$ 09.00

  2. start time $\binom{S}{2}$ 12.00 →   2. end time $\binom{S}{2}$ 14.00

  3. start time $\binom{S}{3}$ 16.00 →   3. end time $\binom{S}{3}$ 23.00

18. Reset function / factory settings – individual settings will get lost

– the adjusted settings remain stored

☞ Ⓜ ⇨ ❄

– Press the key Ⓜ till the symbol ❄ appears

☞ ⊙ + Ⓜ + △ ⇨ **Just** ⇨ $\frac{J}{1}$ **S**

  simultaneously
  for 5 sec.

– Actuate the ⊙ key first, then press the keys Ⓜ and △ both simultaneously for 5 sec. until the display is no longer lit, then let the keys go
  All individually made setting adjustments have now been reset to the factory settings.

	Adjustment	Factory settings
J1	Actual value / clock time	Alternating display
J2	Max. set temperature	30° C
J3	Min. set temperature	5° C
J4	Temperature adjustment	0 K
J5	Max. floor temperature	50° K
J6	Load current adjustment	6 A
J7	Self-learning function	1

🗑 **Entsorgungshinweis**
Das Gerät darf nicht im allgemeinen Hausmüll entsorgt werden.